

Claims

What is claimed is:

- 1 1. A method of automation performed on a semiconductor manufacturing tool,  
2 comprising the acts of:
  - 3 (a) automatically running a set of designed experiments on the tool;
  - 4 (b) collecting data resulting from running the experiments;
  - 5 (c) creating a model based on the collected data; and
  - 6 (d) using the model to control the tool.
- 1 2. The method of claim 1, wherein act (b) is performed automatically.
- 1 3. The method of claim 1, wherein act (c) is performed automatically.
- 1 4. The method of claim 1, further including:  
2 automatically creating the set of designed experiments for the tool.
- 1 5. The method of claim 1, further including:  
2 importing one or more designed experiments from an external system.
- 1 6. The method of claim 1, further including at least one of:  
2 importing data collected by running at least one experiment on an external  
3 system; and  
4 importing data collected during at least one previously run experiment.
- 1 7. The method of claim 6, further including:  
2 automatically creating a model based on the imported data and user input.
- 1 8. The method of claim 6, further including:

2            automatically creating a model based on the collected data, the imported data and  
3            user input.

1        9.        The method of claim 1, further including:

2            allowing a user to interactively select one or more parameters to be adjusted  
3            between the experiments of the designed set of experiments and select one or more set of  
4            data to be collected.

1        10.       The method of claim 1, further including:

2            automatically generating the design set of experiments based on the user selected  
3            parameters and set of data to be collected.

1        11.       The method of claim 1, further including:

2            collecting the data based on a wafer-by-wafer basis.

1        12.       A method of automation performed on a tool to manufacture devices, comprising  
2            the acts of:

3            (a) automatically creating a set of designed experiments;

4            (b) automatically running the set of designed experiments on the tool;

5            (c) automatically collecting data resulting from running the experiments, wherein  
6            the data are collected on a wafer-by-wafer basis;

7            (d) automatically creating a model based on the collected data; and

8            (e) using the model to control the tool.

1        13.       A method of automation performed on a tool to manufacture devices, comprising  
2            the acts of:

3 (a) automatically running a set of designed experiments on the tool;

4 (b) automatically collecting data resulting from running the experiments;

5 (c) creating a model based on the collected data and imported data; and

6 (d) using the model to control the tool.

1 14. The method of claim 13, wherein the imported data are from an external system.

1 15. The method of claim 14, wherein the imported data are from previously run  
2 experiments.

1 16. A system of automating a semiconductor manufacturing tool, comprising:

2 (a) a DOE system configured to automatically create a designed set of  
3 experiments for the tool;

4 (b) a controller configured to automatically run the created set of experiments on  
5 the tool and collect data resulting from running the experiments; and

6 (c) a modeling environment configured to create a model based on the collected  
7 data, wherein the controller is further configured to control the tool based on the created  
8 model, and wherein the DOE system, controller and modeling environment are integrated  
9 with each other.

1 17. The system of claim 16, wherein the DOE system is further configured to create  
2 automatically the set of designed experiments for the tool.

1 18. The system of claim 16, wherein the DOE system is further configured to import  
2 one or more designed experiments from an external system.

1 19. The system of claim 16, wherein the DOE system is further configured to import  
2 at least one of data collected by running at least one experiment on an external system  
3 and data collected during at least one previously run experiment.

1 20. The system of claim 19, wherein the DOE system is further configured to create a  
2 model based on the imported data and user input.

1 21. The system of claim 19, wherein the DOE system is further configured to create a  
2 model based on the collected data, the imported data, and user input.

1 22. The system of claim 16, wherein the DOE system is further configured to allow a  
2 user to interactively select one or more parameters to be adjusted between the  
3 experiments of the designed set of experiments and select one or more set of data to be  
4 collected.

1 23. The system of claim 16, wherein the DOE system is further configured to  
2 generate automatically the design set of experiments based on the user selected  
3 parameters and set of data to be collected.

1 24. The system of claim 16, wherein the controller is further configured to collect the  
2 data based on a wafer-by-wafer basis.

1 25. A computer readable medium for storing instructions being executed by one or  
2 more computers, the instructions directing the one or more computers for automatically  
3 generating design of experiment (DOE), the instructions comprising implementation of  
4 the acts of:

- 5 (a) automatically running a set of designed experiments on the tool;
- 6 (b) automatically collecting data resulting from running the experiments;
- 7 (c) creating a model based on the collected data; and
- 8 (d) using the model to control the tool.

1 26. The medium of claim 25, further including the instructions for implementing the  
2 act of:

3 automatically creating the set of designed experiments for the tool.

1 27. The medium of claim 25, further including the instructions for implementing the  
2 act of:

3 importing one or more designed experiments from an external system.

1 28. The medium of claim 25, further including the instructions for implementing at  
2 least one act of:

3 importing data collected by running at least one experiment on an external  
4 system; and

5 importing data collected during at least one previously run experiment.

1 29. The medium of claim 28, further comprising the instructions for implementing the  
2 act of:

3 automatically creating a model based on the imported data and user input.

1 30. The medium of claim 28, further including the instructions for implementing the  
2 act of:

3            automatically creating a model based on user input, the collected data and the  
4 imported data.

1    31.    The medium of claim 25, further including the instructions for implementing the  
2 act of:

3            allowing a user to interactively select one or more parameters to be adjusted  
4 between the experiments of the designed set of experiments and select one or more set of  
5 data to be collected.

1    32.    The medium of claim 25, further including the instructions for implementing the  
2 act of:

3            automatically generating the design set of experiments based on the user selected  
4 parameters and set of data to be collected.

1    33.    The medium of claim 25, further including the instructions for implementing the  
2 act of:

3            collecting the data based on a wafer-by-wafer basis.

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